Citation:

Sorock GS, Chen LH, Gonzalgo SR, Baker SP. Alcohol-drinking history and fatal injury in older adults. *Alcohol.* 2006 Nov;40(3):193-9.

PubMed ID: 17418699

Study Design:

Case-Control Study

Class:

C - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

- To determine the associations between drinking history and fatal injuries in the elderly, mainly from falls, motor vehicle crashes, and suicides.

Inclusion Criteria:

- This study
  - living in the United States, except South Dakota
  - aged 55 years or older
  - fatalities from motor vehicle crashes (ICD9 codes E810-819), unintentional falls (ICD9 codes E880-888), suicides from all causes (ICD9 codes E950-959)
  - participated in the 1993 National Mortality Follow-Back Survey or the 1992 National Longitudinal Alcohol Epidemiologic Survey
- 1993 National Mortality Follow-Back Survey
  - died in 1993 from injuries
  - 15 years or older
  - living in the United States, except South Dakota
- 1992 National Longitudinal Alcohol Epidemiologic Survey
  - civilian
  - noninstitutionalized
  - adults, aged 18 or older
  - living in the 48 contiguous states and the District of Columbia

Exclusion Criteria:

- This study
  - living in South Dakota
  - younger than 55 years of age

- cause of death was not motor vehicle crashes, unintentional falls or suicides from all causes

Description of Study Protocol:

Recruitment

- Data came from two nationwide surveys
  - 1993 National Mortality Follow-Back Survey
    - provided national estimates of alcohol usage and demographic information among people who died from injuries
  - 1992 National Longitudinal Alcohol Epidemiologic Survey
    - provided national estimates of alcohol usage for the general public

Design: Case-control study

- Cases were chosen from the 1993 National Mortality Follow-Back Survey
  - stratified random sample of 22,957 death certificates representing 2,215,000 adults aged 15 years or older who died in 1993 in the United States, except South Dakota
  - information on decedents was obtained from informants named on the death certificates by mailed questionnaire, telephone or personal interview
  - response rate for the proxy respondents was 83%
- Control were chosen from the 1992 National Longitudinal Alcohol Epidemiologic Survey
  - probability sample of 42,862 civilian, noninstitutionalized adults, aged 18 years or older and living in the 48 contiguous states and the District of Columbia
  - self-reported information was obtained face to face by trained interviewers
  - response rate was 92%

Blinding used (if applicable): Not applicable

Intervention (if applicable): Not applicable

Statistical Analysis

- Weighted analyses were performed using SUDAAN software
- Logistic regression was used to assess the independent association between current drinking and injury death

Data Collection Summary:

Timing of Measurements

- Cases were chosen from the 1993 National Mortality Follow-Back Survey
  - stratified random sample of 22,957 death certificates representing 2,215,000 adults aged 15 years or older who died in 1993 in the United States, except South Dakota
- Controls were chosen from the 1992 National Longitudinal Alcohol Epidemiologic Survey
  - probability sample of 42,862 civilian, noninstitutionalized adults, aged 18 years or older and living in the 48 contiguous states and the District of Columbia

Dependent Variables

- Relationship between alcohol consumption and injury risk

- distribution of drinking levels was analyzed by cause of injury death
- 'current drinkers' in the 1992 National Longitudinal Alcohol Epidemiologic Survey could not be subdivided in a manner permitting discrimination among light, moderate, or heavy drinkers
- the distribution of drinking level by age, gender, and injury mechanism is analyzed for the 1993 National Mortality Follow-Back Survey only

Independent Variables

- Current alcohol consumption
  - current drinkers had at least 12 drinks in the last year of life for the 1993 National Mortality Follow-Back Survey or in the year prior to the survey for the 1992 National Longitudinal Alcohol Epidemiologic Survey
    - light drinker = < 1 drink per day
    - moderate drinker = 1 to 3 drinks per day OR 3 to 4 drinks 1 to 3 times per month OR 5 drinks < once per month
    - heavy or very heavy drinkers = 3 or more drinks at least 3 times per week

Control Variables

- Cigarette smoking
- Demographic characteristics
  - age
  - gender
  - race/ethnicity
- History of heart attack (used as a surrogate measure of the respondent's general health condition)
- Education
- Employment (used as a surrogate for socio-economic status)
- Marriage status
- Cause of death

Description of Actual Data Sample:

Initial N:

- 1,735 cases
- 13,381 controls

Attrition (final N):

- 1,735 cases
- 13,381 controls

Age:

- 55 and older (cases and controls)

Ethnicity:

- Cases
  - 542 white
  - 60 black

        - 52 hispanic
        - 25 other
    - Controls
        - 10,923 white
        - 1,681 black
        - 502 hispanic
        - 185 other

Other relevant demographics:

- Cases
    - 389 men
    - 339 female
- Controls
    - 5,065 men
    - 8,316 women

Anthropometrics: No anthropometric measurements provided

Location: United States

Summary of Results:

Key Findings

- 36% of 1,735 cases and 29% of 13,381 controls consumed 12 or more drinks in the prior 12 months
- Drinking appeared to be associated with suicide more so than with motor vehicle crashes and falls
- Most decedents abstained from alcohol in the last year of life
- In most age categories, the % of moderate or heavy drinkers was greater in male than female decedents
- % of moderate or heavy drinking tended to diminish with increasing age
- Drinking in the last year was associated with a 70% increase in the risk of death from a motor vehicle crash or fall
- Drinking in the last year was associated with a 60% increase in the risk of suicide
    - The effect estimates from the multivariable analysis for having 12 or more drinks in the last year remained approximately the same
- The adjusted odds ratio of suicide for women drinkers versus nondrinkers was 2.5 (95% confidence interval: 1.67-3.68); for men the odds ratio was 1.3 (95% confidence interval: 1.00-1.65)
- The interaction of age by drinking history was not statistically significant for any of the three fatal injury causes

Other Findings

- Cases were older on average, especially those dying from falls (mean age 80 years) than controls (mean age 68 years)
- A higher % of men than women committed suicide or died in motor vehicle crashes.
- % of cases who died in falls was higher for women than men, but similar in proportion to controls

- Being married was associated with reduced occurrence of all three injury events
- Persons who died of falls or suicide were less likely than controls to have worked in the last year
- Decedents who died of falls and motor vehicle crashes were more likely to have a history of heart attack than controls
- Risk of death was greatest for ages 85 years or older but the strongest age gradient was for falls
- Men had a higher risk of all types of fatal injuries than women, especially for suicides

Author Conclusion:

- Having 12 or more drinks a year was associated with a 50-70% increase in risk of motor vehicle crashes, suicides, and falls.
- The risk associated with alcohol may be due to the direct effects of alcohol, as well as detrimental health-related behaviors and may be linked with drinking.

Reviewer Comments:

Authors note the following limitations:

- *Alcohol exposure at the actual time of the event is unknown*
- *Alcohol exposure was obtained for proxies of the cases but from self-reports for the controls*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes

1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	???
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	???
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	Yes
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A

5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	Yes
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	???
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	???
7.5.	Was the measurement of effect at an appropriate level of precision?	???

	7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
	7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
	8.6.	Was clinical significance as well as statistical significance reported?	Yes
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes